PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	Docket No: Q80489
Yoshinori YOSHIDA, et al.	
Appln. No.: 10/802,883	Group Art Unit: 1794
Confirmation No.: 5194	Examiner: Thao T. TRAN
Filed: March 18, 2004	

For: CLEANING SHEET AND ITS PRODUCTION METHOD AS WELL AS TRANSPORTING MEMBER HAVING SUCH CLEANING SHEET

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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I. REAL PARTY IN INTEREST

The real party in interest is NITTO DENKO CORPORATION, by virtue of an assignment recorded in by the Assignment Branch of the U.S. Patent and Trademark Office in the present application on March 18, 2008 at Reel 015118, Frame 0379.

II. RELATED APPEALS AND INTERFERENCES

To the knowledge and belief of Appellant, the Assignee, and the undersigned, there are no other appeals or interferences before the Board of Appeals and Interferences ("Board") that will directly affect or be affected by the Board's decision in the instant Appeal.

III. STATUS OF CLAIMS

Claims 1-6, 13-15 and 19-28, all the claims pending in the application, stand rejected and are the basis for this Appeal. Claims 7-12 and 16-18 were canceled previously from the application.

Claims 14 and 15, which previously had been rejected as anticipated by Grube in the Office Action dated April 18, 2006, are not expressly mentioned in the final Office Action dated September 18, 2008 from which this appeal is taken, but are assumed to be rejected as well and for the sake of efficiency, are the subject of this appeal.

IV. STATUS OF AMENDMENTS

The Amendment under 37 C.F.R. § 1.114(c) filed October 31, 2007 in response to the final Office Action dated August 23, 2007 has been entered according to the Examiner's first Office Action dated January 14, 2008.

Thus, there are no outstanding Amendments to the Claims or Specification in the present application.

The Appendix included with this Brief sets forth the claims involved in the Appeal and reflects the Claims as presented. All previous Amendments have been entered.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

In the following Summary, the citations to elements and the specific teachings in the application are for purposes of exemplification only. Therefore, these citations are not to be construed as limiting the claim language in any way.

Independent claim 1 is directed to:

A cleaning sheet (10)[1] for removing foreign matter adhering on a tip of a probe needle of a probe card[2], comprising a cleaning layer (1) having a surface, the surface of the cleaning layer forming one surface of the cleaning sheet, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer[3], wherein said cleaning layer contains additives [4]in amounts within a range in which the probe needle is not worn[5], wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2 [6]and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material

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[1] Page 7, lines 9-10 and Figs. 1A, 1B.

[2] Page 4, lines 12-20 and page 26, line 9-page 27, line 1; see also Figs. 3A and 3B.

[3] Page 6, lines 21-24.

[4] Page 11, lines 20-25.

[5] Page 5, lines 4-5.

[6] Page 12, line 10 - page 13, line 5; Tables 1 and 2 at page 28.

on the probe needle after the cleaning operation[7], and wherein said cleaning layer has a thickness within a range of 10 to 500 μm[8].

Independent claim 19 is directed to:

A method of producing a cleaning sheet[9], comprising the steps of:

reacting a polyol and a polyisocyanate in the presence of a vinyl monomer to form a urethane polymer, thereby forming a mixture containing the urethane polymer and the vinyl monomer[10];

coating the mixture on a release sheet or a backing layer[11]; and

irradiating the coated mixture with radiation to cure the mixture to form the cleaning layer[12],

wherein said cleaning layer contains additives[13] in amounts within a range in which the probe needle is not worn[14], wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2[15] and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the

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[7] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[8] Page 18, lines 20-23.

[9] Page 7, lines 9-10 and Figs. 1A, 1B, 2A and 2B

[10] Page 5, line 16-page 6, line 2.

[11] Page 17, lines 11-22.

[12] Page 7, lines 1-8 and page 17, line 23-page 18, line 16.

[13] Page 11, lines 20-25.

[14] Page 5, lines 4-5.

[15] Page 12, line 10 - page 13, line 5; Tables 1 and 2 at page 28.

foreign matter or the cleaning layer material on the probe needle after the cleaning operation[16], and wherein said cleaning layer has a thickness within a range of 10 to 500 μm[17].

Independent claim 20 is directed to:

A method of cleaning a probe needle, comprising contacting a cleaning layer of the cleaning sheet with a probe needle of a probe card having a tip [18]to remove foreign matter adhering on the tip of the probe needle[19], wherein said cleaning sheet comprises a cleaning layer having a surface[20], the surface of the cleaning layer forming one surface of the cleaning sheet, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer[21], wherein, said cleaning layer contains additives[22] in amounts within a range in which the probe needle is not worn[23], wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2[24] and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the

[16] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[17] Page 18, lines 20-23.

[18] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[19] Fig. 3A and 3B

[20] Page 7, lines 9-10 and Figs. 1A, 1B, 2A and 2B.

[21] Page 6, lines 21-24.

[22] Page 11, lines 20-25.

[23] Page 5, lines 4-5.

[24] Page 12, line 10 - page 13, line 5; Tables 1 and 2 at page 28.

cleaning operation[25], and wherein said cleaning layer has a thickness within a range of 10 to 500 μm[26].

Independent claim 21 is directed to:

A method of cleaning a probe needle, comprising contacting a cleaning layer of a transporting member with a probe needle of a probe card having a tip to remove foreign matter adhering on the tip of the probe needle[27], wherein said transporting member comprises a support and a cleaning layer having a surface[28], the surface of the cleaning layer forming one surface of the transporting member, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer[29], wherein said cleaning layer contains additives[30] in amounts within a range in which the probe needle is not worn[31], wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2[32] and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe

[25] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[26] Page 18, lines 20-23.

[27] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[28] Page 15, line 23-page 17, line 10 and Figs. 2A and 2B.

[29] Page 6, lines 21-24.

[30] Page 11, lines 20-25.

[31] Page 5, lines 4-5.

[32] Page 12, line 10 - page 13, line 5; Tables 1 and 2 at page 28.

needle after the cleaning operation[33], and wherein said cleaning layer has a thickness within a range of 10 to 500 μm[34].

Independent claim 22 is directed to:

A cleaning sheet [35]for removing foreign matter adhering on a tip of a probe needle of a probe card[36], comprising a cleaning layer having a surface, the surface of the cleaning layer forming one surface of the cleaning sheet, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer[37], wherein said cleaning layer contains no additives [38]in amounts within a range in which the probe needle is worn[39], wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2[40] and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation[41], and wherein said cleaning layer has a thickness within a range of 10 to 500 μm[42].

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[33] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[34] Page 18, lines 20-23.

[35] Page 7, lines 9-10 and Figs. 1A, 1B.

[36] Page 4, lines 12-20 and page 26, line 9-page 27, line 1; see also Figs. 3A and 3B.

[37] Page 6, lines 21-24.

[38] Page 11, lines 20-25.

[39] Page 5, lines 4-5.

[40] Page 12, line 10 - page 13, line 5; Tables 1 and 2 at page 28.

[41] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[42] Page 18, lines 20-23.

Independent claim 26 is directed to:

A method of producing a cleaning sheet[43], comprising the steps of:

reacting a polyol and a polyisocyanate in the presence of a vinyl monomer to form a urethane polymer, thereby forming a mixture containing the urethane polymer and the vinyl monomer[44];

coating the mixture on a release sheet or a backing layer[45]:

and

irradiating the coated mixture with radiation to cure the mixture to form the cleaning layer[46],

wherein said cleaning layer contains no additives[47] in amounts within a range in which the probe needle is worn[48], wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2[49] and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation[50], and wherein said cleaning layer has a thickness within a range of 10 to 500 μm[51].

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[43] Page 7, lines 9-10 and Figs. 1A, 1B, 2A and 2B

[44] Page 5, line 16-page 6, line 2.

[45] Page 17, lines 11-22.

[46] Page 7, lines 1-8 and page 17, line 23-page 18, line 16.

[47] Page 11, lines 20-25.

[48] Page 5, lines 4-5.

[49] Page 12, line 10 - page 13, line 5; Tables 1 and 2 at page 28.

[50] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[51] Page 18, lines 20-23.

Independent claim 27 is directed to :

27. A method of cleaning a probe needle, comprising contacting a cleaning layer of the cleaning sheet with a probe needle of a probe card having a tip[52] to remove foreign matter adhering on the tip of the probe needle[53], wherein said cleaning sheet comprises a cleaning layer having a surface, wherein the surface of the cleaning layer forms one surface of the cleaning sheet[54], wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer[55], wherein said cleaning layer contains no additives[56] in amounts within a range in which the probe needle is worn[57], wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2[58] and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation[59], and wherein said cleaning layer has a thickness within a range of 10 to 500 μm[60].

Independent claim 28 is directed to:

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[52] Figs. 1A, 1B, 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[53] Figs. 3A and 3B.

[54] Page 7, lines 9-10 and Figs. 1A, 1B, 2A and 2B

[55] Page 6, lines 21-24.

[56] Page 11, lines 20-25.

[57] Page 5, lines 4-5.

[58] Page 12, line 10 - page 13, line 5; Tables 1 and 2 at page 28.

[59] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[60] Page 18, lines 20-23.

A method of cleaning a probe needle, comprising contacting a cleaning layer of a transporting member with a probe needle of a probe card having a tip[61] to remove foreign matter adhering on the tip of the probe needle[62], wherein said transporting member comprises a support and a cleaning layer having a surface, wherein the surface of the cleaning layer forms one surface of the transporting member[63], wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer[64], wherein said cleaning layer contains no additives[65] in amounts within a range in which the probe needle is worn[66], and wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2[67] and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation[68], and wherein said cleaning layer has a thickness within a range of 10 to 500 μm[69].

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[61] Figs. 2A, 2B, 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[62] Figs. 3A and 3B.

[63] Page 15, line 23-page 17, line 10 and Figs. 2A and 2B.

[64] Page 6, lines 21-24.

[65] Page 11, lines 20-25.

[66] Page 5, lines 4-5.

[67] Page 12, line 10 - page 13, line 5; Tables 1 and 2 at page 28.

[68] Fig. 3A and 3B; page 19, line 3-page 20, line 3; Tables 1 and 2 at page 28; page 29, lines 1-10; Examples at page 20, line 5 - page 25, line 5.

[69] Page 18, lines 20-23.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1-5, 13 and 19-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Skinner et al (4,342,793).

B. Claims 1-5, 13[70] and 19-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Grube (6,817,052).

C. Claims 3, 4 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Grube (6,817,052) in view of Skinner et al (4,342,793).

[70] Appellants assume that claims 14 and 15 were intended to be included in this rejection for purposes of this Appeal.

VII. ARGUMENT

The Invention

The claimed product (claims 1 and 22), the claimed method of making the product (claims 19 and 26) and the claimed method of cleaning a probe using the product (claims 20, 21, 27 and 28), all relate to a single cleaning sheet or transporting member for removing foreign matter adhering on a tip of a probe needle of a probe card. The sheet or member comprises a cleaning layer having a specific composition (a urethane polymer and a vinyl polymer comprising an acrylic polymer) and additives in amounts within a range in which the probe needle is not worn. The cleaning layer is defined by physical parameters (elastic modulus within a range of 0.5-100 N/mm^2 and a thickness within a range of 10 to 500 μm) and several express functions.

The claimed product and claimed method expressly required that the cleaning layer is (1) adapted to receive penetrating probe needles and (2) remove and retain impurities from a tip of said probe needles, (3) such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation.

Claim 1 contains limitations that are representative of other independent product and method claims, and the following analysis demonstrating clear error in the Examiner's formulation of a prima facie rejection is applicable to all the claims. Claim 1 defines an economical structure that is uniquely capable of efficiently and effectively solving a problem in

the art, specifically, the removal of debris from probe tips used in semiconductor manufacturing without damage to the probe tips while avoiding residual contamination.

Clear Error in the Rejections

The Examiner looks to the patents to Skinner and Grube to reject the independent claims as being obvious in view of their teachings individually. As demonstrated subsequently, neither reference alone renders the claimed cleaning sheet obvious, as each is substantively different from the invention in structure, function and effect. Moreover, the combination of the two references would not lead to the invention (1) as they are incompatible with each other and (2) fail to teach all the limitations of each of the claims.

The rejections should be overturned because (1) the functional limitations in the claims are effective to define the metes and bounds of the recited materials in the cleaning layer and (2) the cited prior art has clear and express teachings of materials and cleaning steps that function in a direction opposite to that of the present invention, as specifically described below.

The structure of the invention is defined by the function of its materials. The functions define and limit the invention, and distinguish the invention over the prior art materials, which may have similar chemical compositions but for various reasons, such as processing parameters, temperatures, radiation or the like, function totally differently.

A. Claims 1-5, 13 and 19-28 are not unpatentable over Skinner et al (4,342,793) under the provisions of 35 U.S.C. § 103(a), as properly applied.

The patent to Skinner generally teaches a resin compound having utility as a protective, transparent or translucent coating for various substrate materials, as described at col. 1, lines 10-15. The application of the composition in a variety of ways is explained at col. 9, lines 64-68 and the particular compounds used are explained throughout the specification. The coatings in Skinner et al may be used for a variety of purposes, but there is no teaching or suggestion that the coating may be used for wiping debris from a probe needle. Moreover, Skinner does not disclose or suggest that there is no abrasive used in the material so that a probe is not eroded during the cleaning process.

Limitation 1: Receive Penetrating Needles

Skinner does not teach the function of penetrating into a cleaning pad. Indeed, Skinner et al has no relationship whatsoever to a probe cleaning pad. Most importantly, Skinner intends to prevent penetration of its coating, as it is "protective" and has the characteristics of being "hard and tough."

More specifically, Skinner does not teach or suggest that a function of its curable coatings may be in a cleaning pad application. In fact, the exclusive environment for Skinner is the formulation of "interpenetrated resin compositions [that] form ***tough and hard coatings*** on various substrates" (see Abstract), in particular, "***protective***, transparent or translucent coatings for various substrate materials such as wood, paper, metal and plastics."(col. 1, lines 12-15) The focus is on the material and the function of that material is the provision of a ***tough, hard and***

protective coating, not one that is to be penetrated. Such coating would surely result in abrasion and wear of a probe as such tough, hard and protective coating would not function to receive probes in a repetitive cleaning process.

Finally, "adapting" the materials in the coatings of the Skinner" to have the features of the present invention would require the inventive steps only taught by the Appellants.

Limitation 2: Remove and Retain Impurities

The claims state that the single cleaning sheet is operative to both remove and retain impurities. Clearly, for the purpose claimed, this is substantially all impurities.

To one skilled in the art, the very nature of the hart, tough and protective coating in Skinner would preclude it from removing and retaining impurities. Even if forced penetration of the hard material would remove some foreign matter, that material would not retain the foreign matter as its characteristics would cause debris to shed from the material as dust, particles or the like. There would be no adhering. For these reasons the second limitation is not in Skinner.

Limitation 3: No Re-adhering of the Foreign Matter

Appellants again respectfully submit that the claims expressly recite that (1) the layer is operative "to receive penetrating probe needles and remove and retain impurities on a tip of said probe needle" and (2) there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation. Appellants again submit that these are structural limitations that define over the prior art.

Appellants respectfully submit that the Examiner has no basis for asserting that Skinner has such properties, as none are taught, and the disclosed features of the prior art structure are contrary to the recited function of the present invention.

Cured Tough Outer Layer

The Examiner summarily dismisses the Appellants' argument that Skinner has a cured outer layer that results in a ***tough surface*** that prevents (1) penetration by a probe, (2) removal and retention of contaminants, and (3) without leaving cleaning material on the probe. However, the disclosure in Skinner is clear, namely, that the material is "hard and tough' and serves as a protective layer for wood, plastics, and the like. One skilled in the art would understand that this litany of characteristics of the Skinner coating is opposite to those required by the invention.

Even though the disclosed and claimed invention is also directed to a radiation cured layer, which the Examiner asserts may be crosslinked to some limited extent, the distinguishing feature is the existence of several functions not found in the prior art..

Appellants again submit that the coatings in the prior art are ***fully*** crosslinked and, as such, would be too hard for use as a medium for penetration. As already noted, Skinner expressly states that the coatings are to be "tough, hard and protective." Nothing in Skinner teaches or suggests the opposite, that is, a soft layer that is penetrable numerous times and removes and retains contaminants without placing such contaminants or the layer material onto the probe.

Finally, Appellants respectfully submit that, since Skinner's curable coating is the cross-linked hard coating, such coating would ***not*** be used as a cleaning layer for removably receiving

needles and for removing and retaining impurities without re-adhering of debris, as would be understood by those skilled in the art. Clearly, given the use of fully crosslinked material, there would be adhesion of debris.

Product Claims Contain The Three Limitations and They are Not in Skinner

Independent product claims 1 and 22 have the foregoing three limitations. Appellants have demonstrated that Skinner does not have the specific teachings that result in a product that would be useable for cleaning a probe, nor would one skilled in the art, viewing Skinner's disclosed structure and application, consider Skinner's product or a modification thereof as leading to the claimed cleaning sheet or transporting member.

The product claims differ from the claimed method of making a cleaning sheet or transporting member, and the claimed method of cleaning a probe using the cleaning sheet or transporting member. Even if the Board concludes that Skinner's structure somehow can lead to the structure of the claimed invention, the method of making the structure would not be obvious from the teachings in Skinner. Moreover, even if the Board concludes that Skinner's structure and process can lead to the structure of the claimed invention, the method of applying the cleaning sheet to clean a probe would not be obvious from the teachings in Skinner.

Method of Producing Claims Contain The Three Limitations and They are Not in Skinner

Independent claims 19 and 26 that are directed to a method of producing a cleaning sheet have the foregoing three limitations. Appellants have demonstrated that Skinner does not have

the specific teachings that result in a cleaning sheet, particularly one that would be useable for cleaning a probe, nor would one skilled in the art, viewing Skinner's disclosed structure and application, consider Skinner's product or a modification thereof as leading to the claimed method of producing a cleaning sheet having the recited characteristics.

The method of producing claims differ from the claimed product and the claimed method of cleaning a probe using a cleaning sheet or transporting member. Even if the Board concludes that Skinner's disclosure somehow can lead to the steps of the claimed method of producing invention, the structure itself would not be obvious from the teachings in Skinner. Moreover, even if the Board concludes that Skinner's structure and process can lead to the method of producing as claimed, the method of applying the cleaning sheet to clean a probe would not be obvious from the teachings in Skinner.

Method of Cleaning Claims Contain The Three Limitations and They are Not in Skinner

Independent claims 20, 27 and 28, which are directed to a method of cleaning a probe with a cleaning sheet, have the foregoing three limitations. Appellants have demonstrated that Skinner does not have the specific teachings that result in a cleaning sheet, particularly one that would be useable for cleaning a probe, nor would one skilled in the art, viewing Skinner's disclosed structure and application, consider Skinner's product or a modification thereof as leading to the claimed method of cleaning a probe with a cleaning sheet having the recited characteristics.

B. **Claims 1-5, 13 and 19-28 are not unpatentable over Grube (6,817,052) under the provisions of 35 U.S.C. § 103(a), as properly applied.**

The patent to Grube expressly concerns a cleaning sheet for removing debris from a probe tip, where the sheet comprises an outer surface layer 302 on a roller 204 attached to a support arm 202. The arm 202 supports a roller 204 and/or an abrasive roller or other surface, as taught at col. 12, lines 56-57. Grube operates by rubbing the probe tips along the surface (Fig. 8). Moreover, Grube requires use of an abrasive, which is consistent with having a tough outer layer that would prevent penetration by a probe. The outer surface 302 comprises a combination of polymeric materials, such as urethane and acrylic, as disclosed at col. 7, lines 10-23.

Limitation 1: Receive Penetrating Needles

In Grube, the reference teaches a sticky surface roller 204 in combination with an "abrading pad," an "abrading block" or an "abrading roller" that is not illustrated or numbered (see col. 3, lines 49-67). The **abrading pad**, for example, is discussed at col. 9, lines 1-20 as possibly receiving a probe. However, there is no teaching that the roller is penetrated. The abrading pad is penetrated to loosen contaminants in a first step, and the roller is required to remove the resulting debris after loosening in a second step.

Specifically, the text requires first pressing and extracting the tips of probes 104 against an abrading pad (not the roller). Thus, debris on the tips are scrapped off or loosened by repeating a cleaning cycle of pressing and extracting the tips of the probe against (and possibly into) the abrading pad. There is no suggestion that the tips go into the roller 204 or teaching with

respect to the material of the roller. Pressing the probe tips into the abrasive pad will clearly abrade the tips, as the pad is made of abrasive material such as tungsten carbide.

The structure and steps of Grube are totally contrary to the present invention, as the goal in Grube is simply "limiting any damage" (which admits that damage occurs) while the present invention avoids damage.

Two Structures vs One Structure

Based upon the foregoing, it is clear that Grube requires ***two*** structures for use in separate steps, namely, an abrading pad and a roller.

By contrast, the present invention has a ***single structure*** that both (1) loosens contaminants when a probe penetrates into the material, and (2) retains the debris, thereby providing an efficient and effective product and procedure that is highly cost effective.

Cleaning by Abrasion vs No Abrasion Material

In Grube, the abrading pad is made from tungsten carbide or any other appropriate material whose hardness is substantially similar to the hardness of the probe tips (col. 9, lines 6-9 in US 6,817,052). Such "abrading pad," as taught in Grube, will abrade the tips of probes to thereby expose the clean surfaces of the probe tips. For effective operation, both tungsten carbide and the material constituting the probe tips are metals.

By contrast, the "cleaning sheet" of the present invention is made of polymer that is soft and receptive to probe insertion without abrasion.

Limitation 2: Remove and Retain Impurities

Grube clearly relies on an abrasion function of an abrasive structure to remove foreign material. However, the foreign material is left on the surface of the abrasive structure, the probe or the surroundings, thereby causing a contamination problem. Indeed, this is the source of the problem that Grube solves by using a separate sticky roller to retain the residual contaminants left on the probe, as explained at col. 4, lines 25-33.

By contrast, the "cleaning sheet" of the present invention has the function of (1) removing and retaining foreign matter adhered to the probe needle by wiping and pulling on the foreign matter (2) without abrading the tips of probes and (3) without contaminating the environment and probes after the probes are withdrawn. Clearly, the "cleaning sheet" in the present invention has completely different structure and function from that of Grube's "abrading pad" alone or in combination with a roller.

Limitation 3: No Re-adhering of the Foreign Matter

Grube teaches the use of tungsten carbide in his separate abrasive structure that clearly is not intended to retain debris and to produce a probe without adhesion of foreign material, since the abrasive structure must be followed by a surface cleaning roller. By contrast, the cleaning sheet of the invention is made of polymer that is soft and receptive to probe insertion without abrasion, and retains removed material and debris.

Further, if the hard and tough coating of Skinner were applied to the structure of Grube, the coating would break the tips or wear them quickly if penetration were attempted. Finally,

Grube only teaches that his "abrading pad" can have a hardness similar to the probe, and from that description, it would be clear that the probe will be abraded and worn during use. Such material cannot retain foreign matter and debris, again, requiring a subsequent removing structure. The invention accomplishes this in one structure.

Finally, the roller by itself is not the claimed cleaning sheet as it is designed for its cleaning function to have the probes roll against and not into its surface. Even though Grube mentions that the probe tips may be pressed against and possibly into the cleaning pad (see col. 9, 1n. 1-20), this clearly reflects an incidental and not primary function. Moreover, there is no teaching that there would be no re-adhering of foreign matter, especially the roller material, on the probe.

Product Claims Contain The Three Limitations and They are Not in Grube

Independent product claims 1 and 22 have the foregoing three limitations. Appellants have demonstrated that Grube does not have the specific teachings that result in a product that would be useable for cleaning a probe, nor would one skilled in the art, viewing Grube's disclosed structure and application, consider Grube's product or a modification thereof as leading to the claimed cleaning sheet or transporting member.

The product claims differ from the claimed method of making a cleaning sheet or transporting member, and the claimed method of cleaning a probe using the cleaning sheet or transporting member. Even if the Board concludes that Grube's structure somehow can lead to the structure of the claimed invention, the method of making the structure would not be obvious

from the teachings in Grube. Moreover, even if the Board concludes that Grube's structure and process can lead to the structure of the claimed invention, the method of applying the cleaning sheet to clean a probe would not be obvious from the teachings in Grube.

Method of Producing Claims Contain The Three Limitations But They Are Not in Grube

Independent claims 19 and 26 that are directed to a method of producing a cleaning sheet have the foregoing three limitations. Appellants have demonstrated that Grube does not have the specific teachings that result in a cleaning sheet, particularly one that would be useable for cleaning a probe, nor would one skilled in the art, viewing Grube's disclosed structure and application, consider Grube's product or a modification thereof as leading to the claimed method of producing a cleaning sheet having the recited characteristics.

The method of producing claims differ from the claimed product and the claimed method of cleaning a probe using a cleaning sheet or transporting member. Even if the Board concludes that Grube's disclosure somehow can lead to the steps of the claimed method of producing invention, the structure itself would not be obvious from the teachings in Grube. Moreover, even if the Board concludes that Grube's structure and process can lead to the method of producing as claimed, the method of applying the cleaning sheet to clean a probe would not be obvious from the teachings in Grube.

Method of Cleaning Claims Contain The Three Limitations But They are Not in Grube

Independent claims 20, 27 and 28, which are directed to a method of cleaning a probe with a cleaning sheet, have the foregoing three limitations. Appellants have demonstrated that Grube does not have the specific teachings that result in a cleaning sheet, particularly one that would be useable for cleaning a probe, nor would one skilled in the art, viewing Grube's disclosed structure and application, consider Grube's product or a modification thereof as leading to the claimed method of cleaning a probe with a cleaning sheet having the recited characteristics.

C. Claims 3, 4 and 6 are not unpatentable over Grube (6,817,052) in view of Skinner et al (4,342,793) under the provisions of 35 U.S.C. § 103(a), as properly applied.

Incompatible Prior Art Teachings Prevent Their Combination

Grube et al teaches directly opposite (1) to Skinner et al and (2) the present invention. Grube requires use of an abrasive, which is consistent with having a tough outer layer that would prevent penetration by a probe. The "tough, hard and protective" layer of Skinner et al, if used to clean the tips of probes in Grube, would not involve penetration but only surface rubbing. To the extent that there is penetration of an abrasive pad in a first step required by Grube, followed by a rubbing on a separate roller in a second step, there is a teaching away from the one-step process and structure of the present invention.

Skinner is not combinable with Grube and, even if combined, because each is deficient with respect to the three critical limitations identified above, does not satisfy the limitations in any of the independent claims or the foregoing dependent claims.

Product Claims Are Not Obvious in View of Grube and Skinner

Independent product claims 1 and 22 have the foregoing three limitations that Appellants have demonstrated do not exist in Grube or Skinner. Appellants have demonstrated that neither of Grube or Skinner, taken alone or in combination, have the specific teachings that result in a product that would be useable for cleaning a probe, nor would one skilled in the art, viewing the diverse structures and applications disclosed in Grube or Skinner, consider their products or a modification thereof as leading to the claimed cleaning sheet or transporting member.

As already noted, the product claims differ from the claimed method of making a cleaning sheet or transporting member, and the claimed method of cleaning a probe using the cleaning sheet or transporting member. Even if the Board concludes that the combination of teachings in Grube and Skinner somehow can lead to the structure of the claimed invention, the method of making the structure would not be obvious from the teachings in Grube and Skinner. Moreover, even if the Board concludes that the structure and processes in Grube and Skinner can lead to the structure of the claimed invention, the method of applying the cleaning sheet to clean a probe would not be obvious from the teachings in Grube and Skinner.

Method of Producing Claims Are Not Obvious in View of Grube and Skinner

Appellants have demonstrated that Grube and Skinner do not have the specific teachings that result in a cleaning sheet as recited in claims 19 and 22, particularly one that would be useable for cleaning a probe. Moreover, one skilled in the art, viewing the disclosed structure and application in Grube and Skinner, would not consider any resulting product or a modification thereof as leading to the claimed method of producing a cleaning sheet having the recited characteristics.

The method of producing claims differ from the claimed product and the claimed method of cleaning a probe using a cleaning sheet or transporting member. Even if the Board concludes that the disclosure in Grube and Skinner somehow can lead to the steps of the claimed method of producing invention, the structure itself would not be obvious from the teachings in Grube and Skinner. Moreover, even if the Board concludes that the structure and processes in Grube and Skinner can lead to the method of producing as claimed, the method of applying the cleaning sheet to clean a probe would not be obvious from the teachings in Grube and Skinner, taken alone or in combination.

Method of Cleaning Claims Are Not Obvious in View of Grube and Skinner

Appellants have demonstrated that Grube and Skinner do not have the specific teachings that result in a method of cleaning a probe with a cleaning sheet, as recited in independent claims 20, 27 and 28. Appellants have demonstrated that neither Grube nor Skinner has the specific teachings that result in a cleaning sheet, particularly one that would be useable for cleaning a

probe, nor would one skilled in the art, viewing Grube's and Skinner's disclosed structure and application, consider any resulting product or a modification thereof as leading to the claimed method of cleaning a probe with a cleaning sheet having the recited characteristics.

Conclusion

For all of the foregoing reasons, the two cited references, individually or together, are clearly deficient in failing to teach all of the limitations of the claims, teach away from the present invention and, are not combinable due to the inconsistency in their structures and operations

The USPTO is directed and authorized to charge the statutory fee (37 C.F.R. §41.37(a) and 1.17(c)) and all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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WASHINGTON OFFICE
23373
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CLAIMS APPENDIX

CLAIMS 1-6, 13-15, 19-28 ON APPEAL:

1. A cleaning sheet for removing foreign matter adhering on a tip of a probe needle of a probe card, comprising a cleaning layer having a surface, the surface of the cleaning layer forming one surface of the cleaning sheet, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer, wherein said cleaning layer contains additives in amounts within a range in which the probe needle is not worn, wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2 and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation, and wherein said cleaning layer has a thickness within a range of 10 to 500 μm.

2. The cleaning sheet as claimed in claim 1, wherein the vinyl polymer is an acrylic polymer.

3. The cleaning sheet as claimed in claim 1, wherein the cleaning layer is formed by irradiating radiation to a mixture containing a urethane polymer and a vinyl monomer to cure it and contains the urethane polymer and a vinyl polymer.

4. The cleaning sheet as claimed in claim 1, wherein the cleaning layer is formed by reacting a polyol and a polyisocyanate in the presence of a vinyl monomer to form the urethane polymer to form a mixture containing the urethane polymer and a vinyl monomer, and irradiating the mixture with radiation to cure it.

5. The cleaning sheet as claimed in claim 1, further comprising a backing layer.

6. The cleaning sheet as claimed in claim 5, further comprising a pressure-sensitive adhesive layer, wherein the cleaning layer is provided on one surface of the backing layer and the pressure-sensitive adhesive layer is provided on another surface of the backing layer.

7.-12. (canceled)

13. A transporting member comprising a support and the cleaning layer of claim 1 provided on the support.

14. The transporting member as claimed in claim 13, wherein the cleaning sheet is provided on the support through a sticking means.

15. The transporting member as claimed in claim 13, wherein the support is a wafer.

16.-18. (canceled)

19. A method of producing a cleaning sheet, comprising the steps of:

reacting a polyol and a polyisocyanate in the presence of a vinyl monomer to form a urethane polymer, thereby forming a mixture containing the urethane polymer and the vinyl monomer;

coating the mixture on a release sheet or a backing layer; and

irradiating the coated mixture with radiation to cure the mixture to form the cleaning layer,

wherein said cleaning layer contains additives in amounts within a range in which the probe needle is not worn, wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2 and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation, and wherein said cleaning layer has a thickness within a range of 10 to 500 μm.

20. A method of cleaning a probe needle, comprising contacting a cleaning layer of the cleaning sheet with a probe needle of a probe card having a tip to remove foreign matter adhering on the tip of the probe needle, wherein said cleaning sheet comprises a cleaning layer having a surface, the surface of the cleaning layer forming one surface of the cleaning sheet, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer, wherein, said cleaning layer contains additives in amounts within a range in

which the probe needle is not worn, wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2 and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation, and wherein said cleaning layer has a thickness within a range of 10 to 500 μm.

21. A method of cleaning a probe needle, comprising contacting a cleaning layer of a transporting member with a probe needle of a probe card having a tip to remove foreign matter adhering on the tip of the probe needle, wherein said transporting member comprises a support and a cleaning layer having a surface, the surface of the cleaning layer forming one surface of the transporting member, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer, wherein said cleaning layer contains additives in amounts within a range in which the probe needle is not worn, wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2 and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation, and wherein said cleaning layer has a thickness within a range of 10 to 500 μm.

22. A cleaning sheet for removing foreign matter adhering on a tip of a probe needle of a probe card, comprising a cleaning layer having a surface, the surface of the cleaning layer forming one surface of the cleaning sheet, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer, wherein said cleaning layer contains no additives in amounts within a range in which the probe needle is worn, wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2 and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation, and wherein said cleaning layer has a thickness within a range of 10 to 500 μm.

23. The cleaning sheet as claimed in claim 22, further comprising a backing layer.

24. The cleaning sheet as claimed in claim 23, further comprising a pressure-sensitive adhesive layer, wherein the cleaning layer is provided on one surface of the backing layer and the pressure-sensitive adhesive layer is provided on another surface of the backing layer.

25. A transporting member comprising a support and the cleaning layer of claim 22 provided on the support.

26. A method of producing a cleaning sheet, comprising the steps of:

reacting a polyol and a polyisocyanate in the presence of a vinyl monomer to form a urethane polymer, thereby forming a mixture containing the urethane polymer and the vinyl monomer;

coating the mixture on a release sheet or a backing layer:

and

irradiating the coated mixture with radiation to cure the mixture to form the cleaning layer,

wherein said cleaning layer contains no additives in amounts within a range in which the probe needle is worn, wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2 and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation, and wherein said cleaning layer has a thickness within a range of 10 to 500 μm.

27. A method of cleaning a probe needle, comprising contacting a cleaning layer of the cleaning sheet with a probe needle of a probe card having a tip to remove foreign matter adhering on the tip of the probe needle, wherein said cleaning sheet comprises a cleaning layer having a surface, wherein the surface of the cleaning layer forms one surface of the cleaning sheet, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer, wherein said cleaning layer contains no additives in amounts within a range in which the probe needle is worn, wherein the cleaning layer has an initial elastic modulus within a

range of 0.5-100 N/mm^2 and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation, and wherein said cleaning layer has a thickness within a range of 10 to 500 μm.

28. A method of cleaning a probe needle, comprising contacting a cleaning layer of a transporting member with a probe needle of a probe card having a tip to remove foreign matter adhering on the tip of the probe needle, wherein said transporting member comprises a support and a cleaning layer having a surface, wherein the surface of the cleaning layer forms one surface of the transporting member, wherein the cleaning layer contains a urethane polymer and a vinyl polymer comprising an acrylic polymer, wherein said cleaning layer contains no additives in amounts within a range in which the probe needle is worn, and wherein the cleaning layer has an initial elastic modulus within a range of 0.5-100 N/mm^2 and is adapted to receive penetrating probe needles and remove and retain impurities from a tip of said probe needles such that there will be no re-adhering of the foreign matter or the cleaning layer material on the probe needle after the cleaning operation, and wherein said cleaning layer has a thickness within a range of 10 to 500 μm.

EVIDENCE APPENDIX:

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), Appellant submits that there are no copies submitted under this section, as there was no evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a court or the Board to be submitted as there were no proceeding identified above in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).